

DP-301411

CLAIMS

1. (Original) A gas sensor, comprising:
a first electrode and a reference electrode with an electrolyte disposed therebetween, wherein the first electrode and the reference electrode are in ionic communication, wherein the reference electrode has a surface on a side of the reference electrode opposite the electrolyte and the surface has a surface area; and
a reference gas channel in fluid communication with the reference electrode, wherein at least a portion of the surface of the reference electrode physically contacts at least a portion of the reference gas channel, and wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 90% of the surface area.
- M 2. (Original) A gas sensor as in Claim 1, wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 75% of the surface area.
3. (Original) A gas sensor as in Claim 2, wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 50% of the surface area.
4. (Original) A gas sensor as in Claim 3, wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 25% of the surface area.
5. (Original) A gas sensor as in Claim 4, wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 15% of the surface area.

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6. (Original) A gas sensor as in Claim 1, further comprising a heater disposed in thermal communication with the reference electrode.

7. (Original) A gas sensor as in Claim 1, wherein the gas sensor has an impedance below about 4,000 Ω .

8. (Original) A gas sensor as in Claim 7, wherein the gas sensor has an impedance below about 3,500 Ω .

9. (Original) A gas sensor as in Claim 8, wherein the gas sensor has an impedance below about 3,400 Ω or less.

10. (Original) A gas sensor as in Claim 1, wherein a first electrode size is different than a reference electrode size.

11. (Original) A gas sensor as in Claim 10, wherein the first electrode size is smaller than the reference electrode size.

12. (Original) A method for forming a gas sensor, comprising:
disposing an outer electrode and a reference electrode on opposite sides of an electrolyte such that the outer electrode and the reference electrode are in ionic communication, wherein the reference electrode has a surface on a side of the reference electrode opposite the electrolyte;

disposing at least a portion of a fugitive material in physical contact with a portion of the reference electrode surface, wherein the reference electrode has a surface area and the portion of the reference electrode surface in physical contact with the fugitive material is less than about 90% of the surface area;

disposing a heater on a side of the fugitive material opposite the reference electrode to form a green sensor; and

co-firing the green sensor.

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13. (Original) A method for forming a gas sensor as in Claim 12, wherein the portion of the reference electrode surface in physical contact with the fugitive material is less than about 75% of the surface area.

14. (Original) A method for forming a gas sensor as in Claim 13, wherein the portion of the reference electrode surface in physical contact with the fugitive material is less than about 50% of the surface area.

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15. (Original) A method for forming a gas sensor as in Claim 14, wherein the portion of the reference electrode surface in physical contact with the fugitive material is less than about 25% of the surface area.

16. (Original) A method for forming a gas sensor as in Claim 15, wherein the portion of the reference electrode surface in physical contact with the fugitive material is less than about 15% of the surface area.

17. (Original) A method for forming a gas sensor as in Claim 12, wherein the gas sensor has an impedance below about 4,000 Ω .

18. (Original) A method for forming a gas sensor as in Claim 17, wherein the gas sensor has an impedance below about 3,500 Ω .

19. (Original) A method for forming a gas sensor as in Claim 18, wherein the gas sensor has an impedance below about 3,400 Ω or less.

20. (Original) A method for forming a gas sensor as in Claim 12, wherein the first electrode and the reference electrode are of different sizes.

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21. (New) A gas sensor, comprising:

a first electrode and a reference electrode with an electrolyte disposed therebetween, wherein the first electrode and the reference electrode are in ionic communication, wherein the reference electrode having a diameter is disposed on an insulating layer having a width, wherein the diameter is up to about 60% to about 85% of the width of the insulating layer.

*85 includes 60**Coating?*

22. (New) A gas sensor as in Claim 21, wherein the reference electrode has a surface on a side of the reference electrode opposite the electrolyte and the surface has a surface area, wherein at least a portion of the surface physically contacts at least a portion of the reference gas channel, and wherein the surface in physical contact with the reference gas channel is less than about 25% of the surface area.

23. (New) A gas sensor as in Claim 21, wherein the gas sensor has an impedance below about 4,000 Ω .

24. (New) A gas sensor as in Claim 21, wherein the diameter is up to about 70% to about 80% of the width of the insulating layer

25. (New) A gas sensor as in Claim 21, wherein a first electrode size is different than a reference electrode size.

26. (New) A gas sensor as in Claim 24, wherein the first electrode size is smaller than the reference electrode size.